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AUTHOR Pearson, P. David; Gallagher, Margaret C.
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ABSTRACT

Research in reading comprehension was reviewed in order to characterize, summarize, and evaluate its contribution to principles of instructional practice. Studies were divided into four major research traditions: existential descriptions, existential proofs, pedagogical experiments, and program evaluations. An examination of these four frameworks revealed several generalizations. For example, existential proofs comparing good and poor readers or older and younger readers established that several behaviors related to strategy use and monitoring discriminate between mature and novice or good and poor readers. On the other hand, existential descriptions of classroom practices and manual suggestions revealed little explicit teaching of either comprehension or comprehension monitoring strategies. The studies also indicated one model of instruction that emphasized guided practice, independent practice, and feedback. Using this model, teachers can train students to summarize an expository passage, ask questions about it, detect difficult portions, and make predictions about following passages, eventually assuming responsibility for monitoring these tasks themselves. (HOD)

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CENTER FOR THE STUDY OF READING

Technical Report No. 297

THE INSTRUCTION OF READING COMPREHENSION

P. David Pearson

Margaret C. Gallagher

University of Illinois at Urbana-Champaign

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University of Illinois
at Urbana-Champaign
51 Gerty Drive
Champaign, Illinois 61820

Bolt Beranek and Newman Inc.
50 Moulton Street
Cambridge, Massachusetts 02238

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The Instruction of Reading Comprehension

While it is still possible to lament the lack of good solid causally interpretable research in the area of reading comprehension instruction (Jenkins & Pany, 1980; Tierney & Cunningham, 1980), there can be little question that more research about the basic processes and instructional practices of reading comprehension has been packed into the last half decade (1978-1982) than in any previous period (however long). The purpose of this review is to characterize, summarize, and evaluate that research in terms of its contribution to principles of instructional practice.

The first and most formidable task of a reviewer is to limit his or her search for potentially relevant studies. This is especially important in the area of reading comprehension given the enormous output of the field in each of the last 6 or 7 years. Since our focus is on instruction rather than basic processes or the development of processes, we will deal with process or cross-age studies only to establish a feeling for the milieu in which research about instruction has been conducted or only if the implications for instruction of a particular, say developmental, study are so strong as to compel comment about it. The major criterion for inclusion, then, becomes, "Did the study examine either comprehension instruction or the consequences of comprehension instruction and/or learning?" A secondary criterion became obvious during the search. The studies dealing with instruction varied along a continuum of interpretability; that is, some studies appeared, prima facie, to be about comprehension instruction, but they were difficult if not impossible to evaluate within the prevailing zeitgeist. In short, they seemed to add

little to our cumulative knowledge about either the nature of comprehension, comprehension instruction or the relationship between the two. This criterion of interpretability, or, if you will, contribution to cumulative knowledge, became a criterion not for inclusion/exclusion but rather for degree of assigned emphasis.

The second task of a reviewer is to establish a framework for organizing the various research efforts that passed the inclusion test. Anyone who has ever searched for such a framework will recognize the arbitrariness of this task; any world, however small and finite, lends itself to different modes of categorization and decomposition. Nonetheless, it must be done. We have divided the world of comprehension instruction studies into four main categories: Existential descriptions, existential proofs, pedagogical experiments and program evaluations. Existential descriptions have a very straightforward purpose: They propose to answer the question, "What's going on out there in the real world of classrooms and instructional materials?" They serve a useful function to the instructional researcher who may wish ultimately to change that real world because they provide a benchmark for evaluating the worth and potential of any positive instructional finding. Existential proofs serve to answer a question preliminary to the conduct of an honest instructional study: "Is a given variable or set of variables operative in the population of learners I might choose later to instruct?" Pedagogical experiments serve to answer specific questions about the efficacy of particular instructional interventions, "What is the impact of this interpretation on students' performance on comprehension tasks X and/or Y and/or Z?" They typically involve relatively short term interventions and

evaluate impacts along a continuum of local to broadly transferable effects. Program evaluations represent attempts to evaluate the "institutionalization" of an instructional variable, or, more likely, a set of instructional variables, by examining their gross long range effects when they have become part of a curriculum implemented by real teachers in real classrooms in real schools. As such, they are capable of answering questions like, "Now that we've proven that a variable is operative, differs from the conventional wisdom, and exhibits a powerful short-range effect, what will happen to it when we mix it up with everything else we normally do as a part of what we call teaching reading on a day-to-day basis?" These four broad categories serve to organize the main part of the paper; only the section on pedagogical experiments will be further decomposed since it represents the bulk of the relevant work conducted since 1978. First, however, we offer a word about the general milieu of reading research, since it has probably served to motivate many of the questions that instructional researchers have asked in recent years.

The Milieu

Reading educators have been trying to answer instructional questions for at least 80 years. They dealt with little but instructional issues during the period from 1920-1970. It is not difficult to determine the very practical motives of the hundreds of comparative evaluations of different beginning reading programs (see Chall, 1967; Bond & Dykstra, 1966), the scores of reading achievement prediction studies (see Barrett, 1967 or Dykstra, 1967 for reviews of these efforts), or the dozens of readability efforts (see Klare, 1963; Klare, 1974-75 for reviews). In

fact, one can argue that it was the sheer weight of such practically motivated research that led, in the early 1970's, to the demise of this long tradition. At the very time when reading educators were thirsting for practical research motivated by underlying models and theories of the reading process, psychologists were working in the newly rediscovered cognitive tradition to participate in what can only be regarded as a proliferation of models of prose comprehension in the middle 1970's. The marriage of these two forces has proven remarkably productive (see Pearson, 1981, for a treatment of these historical forces).

The middle to late 1970's witnessed a barrage of new frameworks for understanding comprehension. It was a period that witnessed the emergence of schemata (Anderson, 1977; Rumelhart, 1980), frames (Minsky, 1975), scripts (Schank, 1973), story grammars (Rumelhart, 1975; Stein & Glenn, 1979; Thorndyke, 1977), and a host of text-analytic schemes (Fredericksen, 1975; Kintsch, 1974; Grimes, 1975; Meyer, 1975). These notions were followed by even stranger constructs like metacognition and metacomprehension (see Baker & Brown, in press, for a review). And it was not just the terminology that was new; despite protestations to the contrary, the ideas were, if not completely novel, at least so much more detailed than their vague predecessors as to cause reading researchers to rethink basic notions about curriculum and instruction.

What is important about the ideas in this milieu is that instructional researchers have tried very seriously to take them into account as they ask what are only on the surface simple questions like, "What's the best way to teach X?" Unlike earlier periods in which a researcher could address an

issue because he or she knew it was a concern for teachers, today's instructional researcher must serve two masters: the theoretician and the classroom teacher. In the current milieu, it is not enough for a study to show an improvement in comprehension performance; it must also link its findings to some theoretically current construct. Now, ultimately, this situation will probably prove beneficial to both theory and practice, for it provides a good reality test for theory and a good theoretical test for practice. But in the interim, it places enormous constraint and responsibility (and sometimes, we think, a quest for prestidigitation) on instructional researchers.

Existential Descriptions

Existential descriptions are conducted in order to describe instruction as it exists in schools and/or materials. In principle, such descriptions remain neutral with respect to evaluating whether what exists is good or bad. Few, however, achieve such neutrality; and even if they do, they are seldom interpreted by others with neutrality.

In the area of reading comprehension instruction, the most influential existential description of classroom practices is Durkin's (1978-79) investigation of how some 39 intermediate grade teachers addressed the phenomenon of reading comprehension. Durkin and her co-workers observed reading and (to a lesser degree) social studies lessons throughout a school year for a total of 17,997 minutes. They classified what they observed into several categories of teacher and/or student behavior. Most relevant to our discussion are these categories of behavior: assessment (the teacher asks students a question about a selection the students have read

recently), comprehension instruction (the teacher offers students some advice, information, or direction about how to understand a text segment longer than a word), assignment-giving (the teacher says enough about an assignment--usually a workbook page or a worksheet--so that the students understand the formal requirements of the task, but stops short of offering students clear explanations about the actual subject matter of the task), practice (students complete a workbook page or a worksheet on their own), and application (asking students to apply a just-taught skill with a new example).

Durkin found that fewer than 50 of the 17,997 minutes of observations (.25%) contained any comprehension instruction. The most commonly observed teacher behavior (17.65%) was assessment followed by giving and helping with assigned worksheets (14.35%). Application simply was not observed. From individual students' point of view, the largest percentage of time was devoted to writing comprehension assignments (about 9%), responding to assessment probes in writing (about 6%), or listening to others answer questions (about 3%).

When Durkin (1981) turned from classroom teachers to the suggestions for comprehension instruction in the teacher's manuals accompanying basal reading programs, she used a similar scheme for analyzing what the manuals directed the teachers to do when working with students on the selections to be read or on the skills to be taught. While these five basal reading series fared somewhat better than did the classroom teachers on the percentage of space devoted to the direct training of comprehension skills, it was still true that the dominant provisions for students to learn various comprehension skills were (1) lots of questions for students to

answer about the selections they read and (2) lots of worksheets and workbook pages for students to complete independently. Even when instruction was provided, Durkin noted that the length of a directive that she, by her very liberal criterion, classified as instructive was sometimes only a single sentence, e.g., "remind the students that the main idea is the most important idea in the paragraph."

Durkin did find one feature often included in basals but seldom employed by teachers--application. Application involves a teacher guiding students to complete an example of an exercise for a given skill; ideally, Durkin thought, application examples would follow some explicit instruction. Instead, what Durkin found is that they often supplanted instruction; this led her to conclude that basals often teach skills "by implication;' that is, giving students a chance to show that they can perform a skill correctly instead of instruction about what the skill is and how one applies it. It represents a sort of pre-independent practice group practice technique. Rarely, however, did manuals offer any suggestions for feedback or what to do if the students failed; instead additional application opportunities were provided.

Durkin was struck with the similarity of what was provided in the manuals and what teachers did in classrooms. The two traditions that seem to dominate both manuals and teacher practice are assessment of selection content and practice of comprehension skills on workbook pages. The hope, apparently, is that eventually students will get the message on their own.

Beck and her colleagues (Beck, McKeown, McCaslin, & Burkes, 1979) analyzed comprehension instruction in basal manuals from a somewhat

different perspective. They examined all the support features of the guided reading lesson (all those before, during and after reading the selection activities teachers are supposed to do with students in the reading group) in order to try to sort out helpful from misleading types of activities. They noted several types of problems: (1) Suggestions for building background often misled students because they focused students' attention on aspects of the selection that are not central to a thorough understanding of the selection. (2) Questions for stories often represented a randomly accumulated quiz of unrelated detail rather than a carefully planned sequence of questions designed to elucidate the causal connections between major story elements and events. (3) The pictures that accompany the early stories often did not support the story line. Like questions and building background activities, they sometimes misdirected students' attention to unimportant textual features.

The most recent flurry of existential descriptions have focused on reading instruction in classes dealing with content areas such as social studies and science. Gallagher and Pearson (1982, 1983) have found several patterns of teacher/student interactions all geared to a common instructional goal--getting the content of the texts into students' heads. The most common pattern (about 65% of the 40 teachers) involved round robin oral reading of the segments (about a page in length) in a chapter with low level detail questions interspersed between segments. In the second most common pattern (about 10%) students read the chapter on their own and then the teacher engaged them in a socratic dialogue that focused upon what the teacher viewed as important in the content. The questions, however, were as likely to emphasize background knowledge or text pictures as text

details. (In a sense, this technique requires the teacher to set up goals about what is important and then to follow whatever line of questions will elicit those understandings.) In the third dominant pattern (about 10%) the students read the text and then the teacher paraphrased it for them; in a sense the teacher told them what it really meant (or what was really worth remembering). Only two teachers in the entire sample spent any time teaching skills or strategies students might use on their own. When Pearson and Gallagher interviewed the teachers, they found that the universal justification for all the strategies teachers used was that so many of the students could not read the books on their own that they had to do something to help them acquire the information presented in the text. This leads to a situation in which teachers feel compelled to do something that duplicates rather than complements the function of the text as a source of key information. The question that arises, of course, is when do students get a chance to acquire strategies they can apply independently as they read.

Neilsen, Kennie, and Connell (1982) used a modification of Durkin's (1978-79) category scheme to classify teacher/student interactions in social studies classrooms. Like Durkin, they found dominant emphases on assessment of chapter content (post-reading questions) and helping students with written assignments. Although they found more explicit instruction in comprehension strategies (2.4%), it still accounted for a miniscule proportion of teacher/student interaction time.

Looking across all of these existential descriptions, one common thread appears. What seems to matter, both to teachers and to basal manual

authors, is the delivery of information. Hence the emphasis in content area lessons on oral reading of the passages and questions that assess the mastery of the content. But even in the basal readers, the emphasis on what Durkin called assessment can be viewed as at least a test of whether the students got some of the information in the story. When skill instruction was offered in the basals, the dominant pattern of delivery was simply to allow students a chance to practice the skill on their own in the hope, perhaps, that they would eventually figure out how to use and apply the strategy independently.

Existential Proofs

The logic of existential proofs seems to be something like this: "If I can prove that a variable affects reading comprehension, then it becomes a candidate for future instructional manipulation. Even better, if I can show that the variable is present to a greater degree in the repertoire of good than poor readers or more mature than less mature readers, then it becomes a candidate to introduce instructionally either in remedial programs or earlier in the school curriculum."

There are numerous studies demonstrating that the same variables that affect adult reading also affect children's reading. Take, for example, schema orientation effect (i.e., the schema into which text information is assimilated affects the way it is encoded into and/or retrieved from memory) so well documented for adults in research efforts like those of Bransford (Bransford & Johnson, 1972; Bransford & McCarrell, 1974), and Anderson (Anderson, Reynolds, Schallert, & Goetz, 1977; Anderson, Spiro, & Anderson, 1978; Pichert & Anderson, 1977). Pearson, Hansen and Gordon

(1979), Pace (1977) and Raphael, Myers, Tirre, Freebody, and Fritz (1981) have documented similar effects for school age children.

Even more research has been conducted tracing the course of development of story schemata (see Stein & Glenn, 1979; Mandler & Johnson, 1977; Thorndyke, 1977 for examples of story grammar constructs). Whaley (1982) and Nielsen (1977) have demonstrated a growth in the sophistication of children's story schemata over time, while Stein and her colleagues have done much to spell out the specific features of story schemata that change across ages. In general what happens is that older readers become more proficient at recalling lower level specific information from stories. Turning to expository structures, Meyer, Brandt, and Bluth (1980) have shown that better junior high readers are more adept at using the text structure employed by an author in organizing their more complete recall protocols than are poor readers. Meyer (1977-a, 1977-b) has also shown that better readers recall more than poorer readers from expository selections, and that while the difference between the two is fairly consistent across levels of importance in the text, it is even more skewed in favor of good readers at lower levels of detail. Apparently for both stories and expositions, one of the abilities that develops is the ability to attach details to more important chunks of information.

Similarly, the work on the ability to draw inferences suggests that older readers draw more spontaneous inferences than do younger readers, although the source of the difference is not clear. For example, Omanson, Warren and Trabasso (1978) attribute it to a difference in prior knowledge of the topic of the text, while Paris (Paris & Upton, 1976; Paris & Lindauer, 1976) prefers to explain it in terms of a predisposition to draw

inferences and remember them. Raphael, Winograd and Pearson (1980) found consistent differences in the ability to draw inferences as both a function of age (4th versus 6th versus 8th grade) and ability (high versus low at each grade level).

Raphael (Raphael & Pearson, 1982; Raphael, Winograd, & Pearson, 1980) has demonstrated quite convincingly that both older and better readers not only are able to answer a variety of types of questions better than are younger and poorer readers, but also that they are better at identifying the kinds of text utilization strategies they employ as they answer questions. In short they are better monitors of their comprehension. On the general issue of monitoring strategy use, recent reviews by Baker and Brown (in press) and Wagoner (1983) suggest that both older and better readers surpass younger and poorer readers on a host of monitoring and metacognitive measures.

While one would expect that many good/poor or older/younger student differences in comprehension could be traced to differences in background knowledge, there are precious few demonstrations of the effect (perhaps because such differences seem so obvious). While not central features of any of the studies, research efforts by Marr and Gormley (1982) and Hayes and Tierney (1982) both show that much of the variance in comprehension attributable to reading ability differences is, at heart, a difference in prior knowledge of topic. These findings parallel the findings of Omanson, et al. (1978); recall that they found differences across ages in inference drawing ability to be largely a difference in prior knowledge of topic. Turning to issues of vocabulary knowledge, there is a similar lack of

direct developmental or cross-ability research, again perhaps because it seems so obvious that better and older readers will possess larger general and content-specific vocabularies than will poorer readers. On average, this has to be true, at least for general vocabulary knowledge; otherwise standardized vocabulary tests could not operate the way they do. However, Johnston and Pearson (1982) and Johnston (in press) found an effect for specific vocabulary knowledge of text topics on comprehension independent of reading ability, implying a less than perfect correlation between ability and vocabulary knowledge.

One could go on and on with reports of such cross-age or cross-ability existential proofs, for this tradition of research has surely dominated the efforts of both psychologists and educators. There are two reasons for stopping the review here. First, while most of the work of developmental psychologists has been directed toward building theories of developmental stages (or at least changes) in performance on various cognitive and metacognitive tasks, that same work, from the viewpoint of the instructional researcher, serves the function of providing existential proofs for the power of variables potentially useful in instructional intervention studies. Second, we have consciously chosen to review only those lines of research that set the stage for the instructional experiments to be reviewed in the next section of this paper. And it is to these instructional experiments that we now direct our attention.

Pedagogical Experiments

The notion of the pedagogical experiment is straightforward: One nudges a small bit of the educational environment of students a little and

then evaluates the effect of the nudge on other features of the environment. There is nothing new about the idea; the term, in fact, was coined long ago by Binet. What is unique about recent work in reading comprehension instruction is the attempt of researchers to test the educational efficacy of ideas that seem to stem rather directly from recent developments in reading theory and/or research about basic cognitive processes.

We originally decided to divide pedagogical experiments into three major but overlapping subcategories: removing roadblocks to comprehension, teaching explicit routines to help students perform comprehension tasks, and teaching monitoring strategies so that students will be able to evaluate whether or not they have applied a routine appropriately. However, the overlap was so great between the latter two categories that we collapsed them into a single category and then sub-divided them on the basis of their central emphasis.

Removing Roadblocks

Given the wealth of research demonstrating the correlation between prior knowledge passage comprehension (e.g., Anderson et al., 1978; Pearson, et al., 1979), the most obvious candidate to manipulate as a potential roadblock is prior knowledge of the topic of the passage to be read. There is a wealth of such research taking shape within several different traditions.

The oldest tradition stems from the advance organizer work of Ausubel (1963, 1968, 1978). The basic paradigm here is to provide readers with an overview of the passage to be read and then evaluate its effect on

comprehension. There have been literally hundreds of advance organizer studies, conducted mostly with college students and sometimes with secondary students. In addition these studies have been reviewed or synthesized on numerous occasions (e.g., Barnes & Clawson, 1975; Hartley & Davies, 1976; Lawton & Wanska, 1977; Mayer, 1979; Luiten, Ames, & Ackerson, 1979; Sledge, 1979; Moore & Readance, 1980). The trends from these syntheses have been so variable that about all one can say is that advance organizers tend, on the whole, to help readers; however, their specific effect is so sensitive to contextual factors (grade level of student, student ability, mode of presentation of organizer, amount of prior knowledge of student, and text difficulty) that few generalizations about their effect tend to hold universally. The most ambitious review (Luiten, et al., 1979) examined some 135 studies, finding an overall positive effect for advance organizers, a tendency for their impact to increase with time, and a variable impact with student aptitude with the nod going to greater benefit for lower aptitude students.

Advance organizer research, however, tests what is perhaps the weakest of hypothetical relationships between prior knowledge and comprehension: Does it help to remind students to make certain schemata available before they read about a topic? An instructionally more relevant question focuses on schema acquisition rather than schema activation. When prior knowledge is meager, are there prereading activities that can help to build it to a state that allows adequate comprehension to occur? The research addressing this question falls into two categories: building background knowledge via topically-relevant texts and/or teaching passage specific vocabulary.

An intuitively appealing strategy for building background knowledge is to provide students analogical ties between a presumably familiar domain and a presumably unfamiliar one. While Dowell (1968) and Brugge (1977) found no effect for the advance presentation of analogical material, Royer and Cable (1975, 1976), and Ausubel and Fitzgerald (1961) found facilitative effects for texts with analogies provided prior to target texts. Hayes and Tierney (1982) compared the pre-target text presentation of texts with explicit analogies between baseball and cricket against texts that provided information either about baseball or cricket. They found a modest tendency for the texts with analogies to elicit superior recall of subsequent articles about cricket; however, both the cricket and the baseball texts elicited nearly as strong effects on subsequent comprehension when compared to a neutral text. Their results, in fact, better support the conclusion that any attempt to provide relevant background knowledge is superior to providing irrelevant experiences, and, hence, tend to support the general schema activation hypothesis.

Crafton (1980) investigated this issue in what might be regarded as a context replicating a typical classroom reading situation. She examined the effects of reading a first article about a topic on reading a second (corresponding, if you will, to the cumulative effect on comprehension one might expect from reading an entire chapter in, say, a science text). She found strong effects for the first reading experience upon the second, suggesting the cumulative effect of schema acquisition across an extended reading experience.

One of the few studies available on literary works was conducted by Graves, Cooke, and LaBerge (1983). They found strong and consistent effects on comprehension of short stories for students of low ability levels when they provided a pre-reading précis of each story (where the précis summarized the problem, events, and resolution of the subsequent story, introduced the characters, and contextually defined potentially difficult vocabulary).

The notion of pre-teaching specific passage vocabulary is as old as teaching reading. Nearly all teachers' manuals for basal readers suggest difficult words for teachers to define and discuss prior to reading a selection. While the relationship between vocabulary knowledge and comprehension is well established (Davis, 1944; Thurstone, 1946; Clark, 1972; Johnston, in press), surprisingly few studies have evaluated the effect of pre-teaching key concepts on subsequent comprehension of passages containing those concepts.

With a few notable exceptions to be discussed subsequently, the consistent finding in this research is that pre-teaching vocabulary by whatever means improves students' knowledge of word meanings but has little discernible effect on passage comprehension (Jackson & Dzeyin, 1963; Lieberman, 1967; Tuinman & Brady, 1974; Pany & Jenkins, 1978; Jenkins, Pany, & Schreck, 1978; Sylvester, 1981).

Exceptions to this general finding come from the work of Swaby (1977); Schachter (1978); Kameenui, Carnine, and Freschi (1982); and Beck, Perfetti, and McKeown (1982).

Swaby (1977) found that a vocabulary technique emphasizing where a new concept "fits" in one's overall semantic network was superior to a more traditional providing-definitions approach in aiding post-passage inference questions for poor sixth-grade readers. By contrast, Schachter (1978) found a similar effect on inferential comprehension only for good fifth grade readers. An examination of the passages used in these two studies reveals that the passages in the Swaby study were relatively easy compared to those used by Schachter. This suggests that there may be an "optimal level of ignorance" (of key concepts) at which vocabulary instruction "takes." If the passages are either too familiar or too unfamiliar to a given group of students, vocabulary knowledge may either be redundant or else too sparse to eliminate strong background knowledge weaknesses.

The most convincing effect for passage specific vocabulary instruction comes from the work of Kameenui, et al., 1982. They found that any sort of vocabulary instruction drastically improved inferential comprehension; further on the same measure a technique in which the vocabulary training emphasized integrating word meanings with story context was superior to one in which students were drilled on definitions.

The work by Beck et al. (1982) shows both content specific and general effects of vocabulary instruction on comprehension. Over a period of several months students were given a rich intensive program of vocabulary development for about 100 words. Many of the procedures were similar to those used by Schachter. At the end of the training period, experimental students outperformed control students on a variety of measures including

the vocabulary and comprehension subtests of a standardized test as well as on stories containing the taught vocabulary items.

As one looks across these various attempts at removing the roadblocks of knowledge deficits, what is impressive, with a few exceptions, is how weak rather than how strong the effects are. On the whole, such intervention seems helpful; but the effects of intervening in the instructional environment to activate or provide background knowledge of one sort or another do not appear nearly as strong as the raw relationships between these indices of background knowledge and comprehension. This contrast in strength of relationships implies that knowledge acquired gradually over time in whatever manner appears more helpful to comprehension than knowledge acquired in a school-like context for the purpose of aiding specific passage comprehension.

Explicit Comprehension Training Coupled with Metacognitive Awareness[1]

As the title for this section implies, much of the research about metacognitive awareness and comprehension monitoring cannot be separated from research about explicit comprehension instruction. This welding of traditions is probably due to the fact that the researchers involved in this research feel as though they have to train students to perform a strategy before they can ask students to monitor its application. Also, it is difficult to suggest to students an alternative comprehension strategy without discussing why it is important and how to know when you have applied it appropriately. Certain instructional attempts will inevitably lead to the intertwining of these components. Indeed, Palinscar and Brown (1983) call it an "instructional package." We have chosen to report these

studies along a continuum of the centrality of monitoring and awareness. In the first several studies reported, the monitoring and awareness component is more peripheral than central; in the remainder, the two strands--explicit instruction in strategy application and awareness and monitoring of strategies--tend to be more equally balanced.

Central strategy emphasis. Several researchers have attempted to help students acquire strategies that will make them better able to understand and remember expository text. Bartlett (1978), taking to heart Meyer, Brandt and Bluth's (1980) dual findings that (1) good readers tend to rely on the author's intended text structure more often than do poor readers in structuring their free recall protocols, and (2) good readers remember more information and more important information, trained junior high students to recognize and use four common text frames (cause-effect, compare-contrast, description, and problem-solution) to help organize recalls of expository passages. On transfer passages trained students were able to produce longer recalls capturing more of the important information than were untrained students.

Taylor and her colleagues (Taylor, 1982; Taylor & Beach, in press) have conducted a series of studies in which they have trained intermediate grade students to relate superordinate to subordinate information to try to build balanced summaries of expository texts. While the results vary somewhat from study to study, her work on the whole tends to support modest transfer effects to novel passage summaries for such training. Interestingly, the effect is conditioned by familiarity of content;

when students read novel passes, they found the strategy more effective in dealing with unfamiliar than familiar content.

Armbruster (1979) and Geva (1983) have used one form or another of a text mapping strategy to aid students to understand and remember text information. Mapping, in contrast to sheer summary training, involves selecting key content from an expository passage and representing it in some sort of visual display (boxes, circles, etc.) in which relationships among key ideas are made explicit. This task is usually done after students read. Like the work of Bartlett, students who do mapping are forced to deal with the structure of the author's text; however, and more importantly, they are forced to try to make connections among ideas even when the author has not explicitly specified those connections. As with the summarizing work of Taylor, the transfer effects to recall have been modest; nonetheless, these studies consistently favor the mapping strategy over simpler more traditional study techniques, such as reading, rereading and taking notes, etc.

Several training studies have aimed at improving children's ability and predisposition to draw inferences. Hansen (1981) began with the observation that children were best at answering the kinds of questions teachers ask most often, namely literal recall of story details (see Guszak, 1967). She wondered whether this observation resulted from an accident of children's instructional history (they have more practice at literal questions), the fact that literal questions are inherently easier than inferential questions, or the fact that children are simply unaware of how to go about drawing inferences. To sort out the competing

explanations, Hansen devised three instructional treatments. In the first, a business as usual approach, average second-grade students were given a traditional diet of questions of about 80% literal and 20% inferential questions along with rather ordinary story introductions. In the second, a practice-only treatment, literal questions were removed from these children's basal reader activities altogether (they received only inferential questions after their stories; additionally, they were given ordinary story introduction). In the third, called a strategy training group, students received the traditional question diet but, prior to each story they were given alternative story introductions in which they were asked to perform these tasks: (1) Relate what they knew (from their prior knowledge) about what to do in circumstances like those the upcoming story characters would experience, and (2) to predict what the story protagonist would do when confronted with these critical situations from the to-be-read story, (3) to write down their prior knowledge answers on one sheet of paper, their prediction on a second, and then weave the two together to establish the metaphor that reading involves weaving together what one knows with what is in a text. They then read the story to compare their predictions with what actually occurred. This final treatment represented an attempt to help change students' conceptions about "the process of reading" to help them become explicitly aware of the "known to new" principle and to allow them to apply this principle.

On four different measures including, notably, a standardized reading comprehension test, Hansen found that the two experimental groups outperformed the control group. The conclusion from these data is that inference performance, even for young students, is amenable to alteration,

either through direct strategy training or through changing the kinds of questions they practice answering.

In a follow-up, Hansen and Pearson (in press) combined the earlier strategy training and question practice approaches into a single treatment. They trained four teachers to administer the treatments instead of teaching the classes themselves, as Hansen had done earlier. Also, they used good and poor fourth-grade readers instead of average second-grade students. The combined approach proved somewhat advantageous for good readers in comparison to the control group. However, it proved extremely effective for the poor readers. Poor readers in the experimental group exceeded their control counterparts on inference measures taken from the materials in which the instruction was embedded as well on measures from three new passages on which no instruction had been offered. From these data, and the data from the earlier study, Hansen and Pearson concluded that younger and older poor readers benefit from explicit attempts to alter comprehension strategies; older good readers, on the other hand, did not seem to benefit nearly so much, perhaps because they have developed adequate strategies on their own.

Gordon and Pearson (1983) pushed the inference training paradigm into an even more explicit mold. Over a period of eight weeks, they contrasted the effects of a group explicitly trained to draw inferences with a control group that received language experience and immersion activities, and a second experimental group whose instruction focused on activating and fine-tuning content schemata (the topics addressed in the stories) and

structural schemata (helping students develop an abstract framework for what is entailed in a story) before and after reading.

The results of Gordon and Pearson's work were consistent with those obtained by Hansen and Pearson (Hansen, 1981; Hansen & Pearson, in press). There were statistically reliable differences favoring the inference training group on new inference items derived from the instructional stories. Also high achieving but not low achieving students in that group did better than other groups on inference items on several posttests involving novel passages and no instruction. The most remarkable differences, however, favored the schemata activation group on the free recall protocols; their scores were often two or three standard deviations above the inference group and the control group, particularly on recall measures which were sensitive to the development and use of a story schema. Significant differences favoring the experimental groups on a standardized test surfaced only for the very best readers.

An interesting conclusion one can draw from the Gordon and Pearson data has to do with the specificity of transfer of training results. Note that students trained to draw inferences got better at that task while students forced to activate both topical and structural schemata got better at storing and retrieving story information.

Balanced emphasis on strategy and monitoring with awareness. Raphael and Pearson (1982) applied a more general approach to both literal and inference questions. During four 45-minute sessions 4th-, 6th-, and 8th-grade students were taught to distinguish between questions that required, in different measure, information in the text versus knowledge the child

already had. The children learned to generate answers to questions that invited textually explicit answers (derive an answer from the same text sentence from which the question was generated), textually-implicit answers (derive an answer from a text sentence different from the one from which the question was derived), or scriptally-implicit answers (derive an answer from one's store of prior knowledge). The three types of questions were labeled RIGHT THERE, THINK AND SEARCH, and ON MY OWN, respectively.

Using a Model --- Guided Practice --- Independent Practice --- Direct Feedback instructional design, they taught the students to apply the strategy to increasingly longer texts, ranging from one paragraph to 600 words, with an increasingly larger number of questions per lesson, and increasingly fewer feedback prompts from the instructor. For each answer given, students were also asked to judge which of the three strategies they had used to generate the answer. On all of the comprehension measures there were reliable differences favoring the training group over the control group. Trained students got better at discriminating questions of the different types, evaluating their own question-answering behavior, and giving quality responses. Raphael and Pearson concluded that students had developed improved comprehension and comprehension monitoring strategies that gave them more control over the kind of routine question answering activity they experience daily in basal reader and content area material.

Raphael, Wonacutt and Pearson (1983) have extended this paradigm by training teachers to apply this strategy with fourth grade students. Again, evaluation of several pre- and posttest measures demonstrated that trained students performed better than untrained students on both monitoring and comprehension tasks.

A study conducted by Day (1980) provides an interesting application of many of these same issues about instructional effectiveness with a very different population and a very different instructional objective. Working with low ability community college students, Day (1980) contrasted approaches to training students to write summaries for prose passages. The treatments differed systematically from one another in terms of how rules for writing summaries were integrated with self-management strategies designed to help students monitor their own progress in summary writing. Treatment 1 consisted of self-management alone (a fairly traditional self-checking procedure to determine whether the summary conveyed the information the student intended to convey). Treatment 2 was rules alone; that is, subjects were trained to use van Dijk and Kintsch's (1978) five rules for summarizing text: delete redundancy, delete irrelevancies, subordinate subtopics, select topic sentences, create topic sentences. Treatment 3 simply put Treatments 1 and 2 together in sequence. First do one, then do the other. Treatment 4 integrated the rules and self-management strategies into a single coherent routine. One might say that the four treatments varied along a continuum of integration of explicit training and explicit monitoring devices. A model --- practice --- feedback instructional design was used. The data from the experiment showed that overall the integrated treatment produced the greatest gains from pretest to posttest. Day concluded that, particularly with slower students, ". . . explicit training in strategies for accomplishing a task coupled with routines to oversee the successful application of those strategies is clearly the best approach" (p. 15).

Palincsar and Brown (1983) evaluated the effects of explicit instruction (modeling and corrective feedback) of four comprehension monitoring activities with learning disabled junior high students who were efficient at decoding but deficient in comprehension. The four activities included summarizing, question generating, predicting what might be discussed next in the text, and clarifying unclear text. The activities were taught through a procedure referred to as reciprocal teaching; the teacher and students took turns assuming the role of teacher in a dialogue about segments of expository texts.

The research involved two studies. Both studies employed a multiple baseline across groups. All students experienced four conditions: baseline, intervention, maintenance, and follow-up. In Study 1 the investigator worked with six students, in pairs, in a setting analogous to a resource room. In Study 2, four reading teachers worked with a total of 21 remedial reading middle school students in small groups in their classrooms.

They found that students' ability to answer comprehension questions, as assessed on passages independent of the training materials, improved significantly, they typically achieved 70% accuracy the fifteenth day of training. The effects were also apparent on an eight week delayed measure. Students' verbal behavior during training indicated that they became more adept with summarizing and question generating as the intervention progressed. Also modest but reliable transfer was suggested on three or four tasks similar to but distinct from (in terms of content) the training tasks. Finally, gains observed in the experimental setting generalized to

the classroom setting (regular social studies and science assignments) for five of the six students in Study 1.

The results of this investigation provide further support to a small body of instructional research in reading comprehension which suggests that students can indeed, through explicit instruction, be taught to acquire and independently apply reading strategies which will enhance reading comprehension.

These instructional experiments (particularly the last three) appear to warrant the conclusion that we can teach comprehension skills if we are able to define them carefully, model for students methods they can use to complete skill activities, offer plenty of guided practice (with the teacher offering feedback as the tasks are completed), and then allow students to practice the skills on their own.

One final comment about this line of work: taken together, these studies suggest that when learning has occurred, it has been through the repetition of a cycle of instructional events--explanation, guided practice, corrective feedback, independent practice and application. It is not simply a matter of increasing the amount of instruction as Durkin's work reviewed earlier invites us to conclude (Durkin, 1978-79). Rather, it is the entire instructional framework which integrates all these components for students that leads to effective and independent strategy use.

Program Evaluations

There have been two projects in which after new ideas about reading comprehension have been incorporated into a curriculum, the more or less long-term effects of that curriculum have been evaluated against competing

curricula. The first project is located in Honolulu, and the effects of the new curriculum have been studied over a five year period. The second, located in Michigan, was evaluated over a single school year with a follow-up eight months after the project ended. Both claim to have used elements of the "direct instruction" model used in the Follow-through Studies of the Seventies comparing DISTAR with other compensatory programs (Becker, 1977) and reviewed by Rosenshine (1979) among others. The direct instruction model, according to Rosenshine, includes these features:

1. A complex skill is broken down into small steps
2. For each step the teacher
    a. demonstrates how it should be performed
    b. conducts guided practice lessons (working through examples of step application with the students)
    c. provides for independent practice or application (mostly to promote automatic skill application)
    d. feedback (in the form of correction and information about how to apply a step) occurs in steps (a) through (c) but is most prevalent in (b).

Rosenshine has concluded that much of the process/product research supports the steps involved in the direct instruction model (i.e., these behaviors are positively correlated with achievement gain), but only for certain skill areas (e.g., decoding or math) in which it is possible to break complex skills down into manageable and psychologically real subskills. He is pessimistic about applying the model to fuzzier areas like comprehension, composition, or creativity. Nonetheless, it is precisely to

these fuzzier areas that these two evaluation projects have claimed to apply these principles.

The Kamehameha Early Education Project (KEEP) has been discussed extensively in two recent articles (Tharp, 1982; Au & Mason, 1981). KEEP claims to operate a direct instruction model that focuses primarily on comprehension, but with instruction that is both child focused and task focused.

Two characteristics of the KEEP program make it particularly interesting to instructional researchers: (1) Its students have been high-risk, low-income, native Hawaiian children; and (2) it is remarkably effective in increasing student performance as measured by standardized tests (Tharp, 1982). The program has evolved over several years, with each succeeding cohort of students gaining over (or maintaining equity with) its immediate predecessor. It is labeled a direct instruction model, though it lacks several of the characteristics of direct instruction as defined by others (cf. Rosenshine, 1979). What it does have are these characteristics: (a) At least 20 minutes per day (and about 2/3 of the total time any given teacher spends interacting with a group of students) is devoted to comprehension activity (usually focused on story discussion) with each reading group (K-3). (b) Instruction occurs in small ($5 < N < 10$) groups. (c) Much of the instruction occurs during story discussion; that is, what distinguishes KEEP from other programs is the systematic use of thought-provoking questions. The questions form a "line of questions," thus avoiding the problems pointed out by Durkin (1978-79) and Beck et al. (1979). (d) The program has been designed to maximize consistency with native Hawaiian culture. Notably, whereas most teachers use participation

structures in which one person (teacher or student) at a time has the floor, teachers in this program allow responses and comments and questions from two or more students at a time and from the joint effort of two or more students (Au & Mason, 1981). (e) Student progress (via criterion-referenced tests) and teacher adherence to suggested methods (via observation) are monitored regularly and intensively.

The program emphasizes high engagement rates, extensive monitoring, and group instruction. However, unlike DISTAR there are no explicit rules (general cases) taught for completing comprehension tasks and the model-lead-test framework is not adhered to in any serious way. The KEEP program really uses an inundation-discovery approach to improving comprehension. The rationale seems to be, if students are constantly barraged with well-conceived interrogations of text, eventually they will learn what to attend to when they read texts on their own. In some ways, the KEEP project is similar to the Question-Practice Group in the Hansen (1981) study reported earlier. On the other hand, the data suggests that a frontal assault on comprehension oriented activity encouraged growth in comprehension, with no apparent decrement on decoding skills, which are mainly taught in individual exercises.

The closest approximation of a "curriculum program" in explicit comprehension instruction coupled with metacognitive awareness and comprehension monitoring training comes from the work of Paris and his colleagues at Michigan (Paris, Lipson, Cross, Jacobs, De Britto, & Oka, 1982). They developed a twenty week "course" for third- and fifth-grade students designed to improve the control over and understanding of (a) the

goals of reading, (b) strategies for comprehension and (c) strategies to "fix-up" comprehension failures. Instruction related to each of these goals was provided sequentially over the 20 weeks. For each week's lesson, they followed certain principles derivable from work on direct instruction (cf. p. 26). First, they used a metaphor designed to help make each principle concrete. For example, for two of the weekly lessons involving "understanding the goals and plans of reading," they provided a bulletin board display (complete with picture) with the metaphors "reading is Like a Puzzle," and "A Bag Full of Tricks for Reading." Second, they provided teachers and students with a set of focal questions pertaining to application of the week's principle. Third, teachers discussed the objective for each week's lesson early and often. Fourth, teachers held numerous discussions throughout the week focusing first on group attempts to apply the principle and later on how well various individuals had actually applied the principle during practice activities. Finally, students had lots of opportunity for practice and feedback related to each principle. In short, there was a high level of student involvement and interaction.

The effects in comparison with a placebo control group were reliable, robust, and enduring. On measures of strategy knowledge and use (including think-aloud protocols as well as multiple choice tests), experimenter-designed measures of reading comprehension closely allied to the trained tasks, and more distant measures of transfer such as cloze tests and a standardized reading tests, the experimental groups' performance exceeded that of the control group. Furthermore, these effects were still reliable in a follow-up battery given eight months later.

The interesting thing to note about these conclusions is their similarity with those derived from the previous section on instructional experiments. While the tasks in the two sets of studies are sometimes different, the principles leading to effective performance are remarkably similar. Explicit instruction associated with guided practice, lots of opportunity to practice and apply strategies independently, as well as some attention to monitoring the application of such strategies seems to help students perform better on a variety of comprehension measures.

Summary and Conclusions

From our examination of these four research traditions, certain generalizations seem warranted.

Existential proofs comparing good and poor readers or older and younger readers have established that several behaviors related to strategy use and monitoring discriminate the mature from the novice and the good from the poor reader. Older and better readers (a) are more effective at engaging background knowledge, (b) have better general and specific vocabularies, (c) are better at drawing interences, (d) have better summarization skills, (e) can use text structure more effectively to produce more complete recall protocols, (f) know more about the strategies they employ to answer questions, and (g) in general, are better at monitoring and adjusting whatever strategies they use. On the other hand, existential descriptions of classroom practice and manual suggestions have established the fact that very little in the way of explicit teaching of either comprehension strategies or strategies for monitoring comprehension occur.

The key question for instruction is whether one ought to bother to offer explicit training to improve either comprehension or monitoring strategies; after all, the longer people stay in school, the better they get at all these behaviors, even in the apparent absence of any training. In other words, sheer practice (or perhaps even just getting older) seems to elicit stronger performance.

Sheer practice, however, may be beneficial only for that subset of students already well on their way to success; having developed appropriate strategies spontaneously, practice helps them fine tune their repertoire of successful strategies. However, if poor readers do little but practice what they already do, they may actually strengthen their already inappropriate strategies and behaviors. It is possible that the "practice only" approach underlying current instruction may promote a "rich get richer and poor get poorer" phenomenon. The success of explicit training procedures for low achievers (Day, 1980; Hansen & Pearson, in press; Palincsar & Brown, 1983; Tharp, 1982) suggests an alternative instructional philosophy at least for students who are at risk in one way or another.

What appears warranted from all these studies is a particular model of instruction which we have extrapolated from Campione (1981). Figure 1 depicts graphically its essential features. Any academic task can be conceptualized as requiring differing proportions of teacher and student

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Insert Figure 1 about here.

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responsibility for successful completion. The diagonal line on the graph represents a journey from total teacher responsibility (on the far left) to total student responsibility (on the far right). When the teacher is taking all or most of the responsibility for task completion, he is "modeling" or demonstrating the desired application of some strategy. When the student is taking all or most of that responsibility, she is "practicing" or "applying" that strategy. What comes in between these two extremes is the gradual release of responsibility from teacher to student, or what Rosenshine might call "guided practice." The hope in the model is that every student gets to the point where she is able to accept total responsibility for the task, including the responsibility for determining whether or not she is applying the strategy appropriately (i.e, self-monitoring). But the model assumes that she will need some guidance in reaching that stage of independence and that it is precisely the teacher's role to provide such guidance. Only partly in jest we like to refer to the model as a model of "planned obsolescence" on the part of the teacher; but just because you want to end up being obsolete doesn't mean you have to start out by being obsolete!

The critical stage of the model is the "guided practice," the stage in which the teacher gradually releases task responsibility to students. In the Gordon and Pearson (1983) study that release was accomplished by conceptualizing an inference task as involving four components: (a) posing a question, (b) answering it, (c) finding evidence, and (d) giving the reasoning for how to get from the evidence to the answer. In stage (1), Modeling, the teacher did all four tasks (a) - (d); in stage (2), the

teacher did (a) and (b) while students did (c) and (d); in stage (3), the teacher took responsibility for (a) and (c) and the students, (b) and (d); finally in stage 4, the students did all but (a).

In Palincsar and Brown's (1983) work, the gradual release was accomplished in a reciprocal teaching milieu. The end goal was to get LD and remedial middle school students to perform four tasks for any given expository passage: (1) summarize it, (2) ask a few questions about it, (3) detect difficult portions and (4) predict what the next part was going to be about. First, the teacher was the "teacher;" when he was, he guided the discussion that led to closure on these four tasks. After a few models by the teacher, students took the role of "teacher" and assumed the responsibility for guiding the discussion related to these four common tasks. As the work progressed the teacher (not the student "teacher") faded more and more into the woodwork as the students became more confident in assuming the "teacher" role. In both these instances, the students learned to do what the experimenters wanted them to learn to do with remarkable success.

In the work of Paris et al. (Note 4), the release was accomplished via the practice/feedback discussion sessions, as it was in the work of Raphael (Raphael & Pearson, 1982; Raphael, Wonacutt & Pearson, 1983).

What does this model share with the Rosenshine model of direct instruction? The stages are quite similar; modeling guided practice, and independent practice or application are features of both. Feedback at stages is critical (even when the teacher is not the "teacher" he must provide feedback about how well the group is accomplishing its goals along the way). How does this model differ from direct instruction? There is no

assumption that complex strategies must be broken down into separate, sequentially ordered subskills. It is possible, if you will, to talk about explicit instruction in wholistic strategies. There is no assumption that there is a single correct answer to any question or a single best way of applying a strategy. Variation in response can be expected, even encouraged. On the other hand, what is expected is (a) that answers, summaries, or strategy applications can be justified and (b) that students will assume responsibility for monitoring them. Feedback is less corrective feedback in the sense that the teacher gives the right answer or strategy when a student fails; instead, feedback is more suggestive in the sense that the teacher praises the students applying for parts of the strategy appropriately and expects them to consider alternative ways of attacking a problem.

One last comment about stages of research. One wonders whether or not the positive findings from the instructional experiments and program evaluations would ever have emerged had it not been for the fact that the existential descriptions had established the need for a different approach to instruction and that the existential proofs had pointed out some strategy and monitoring behaviors that might serve as likely candidates for instructional intervention. There does seem to be some hope for the bridge between basic research, applied research and practice that we so often mention but so seldom achieve.

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Footnotes

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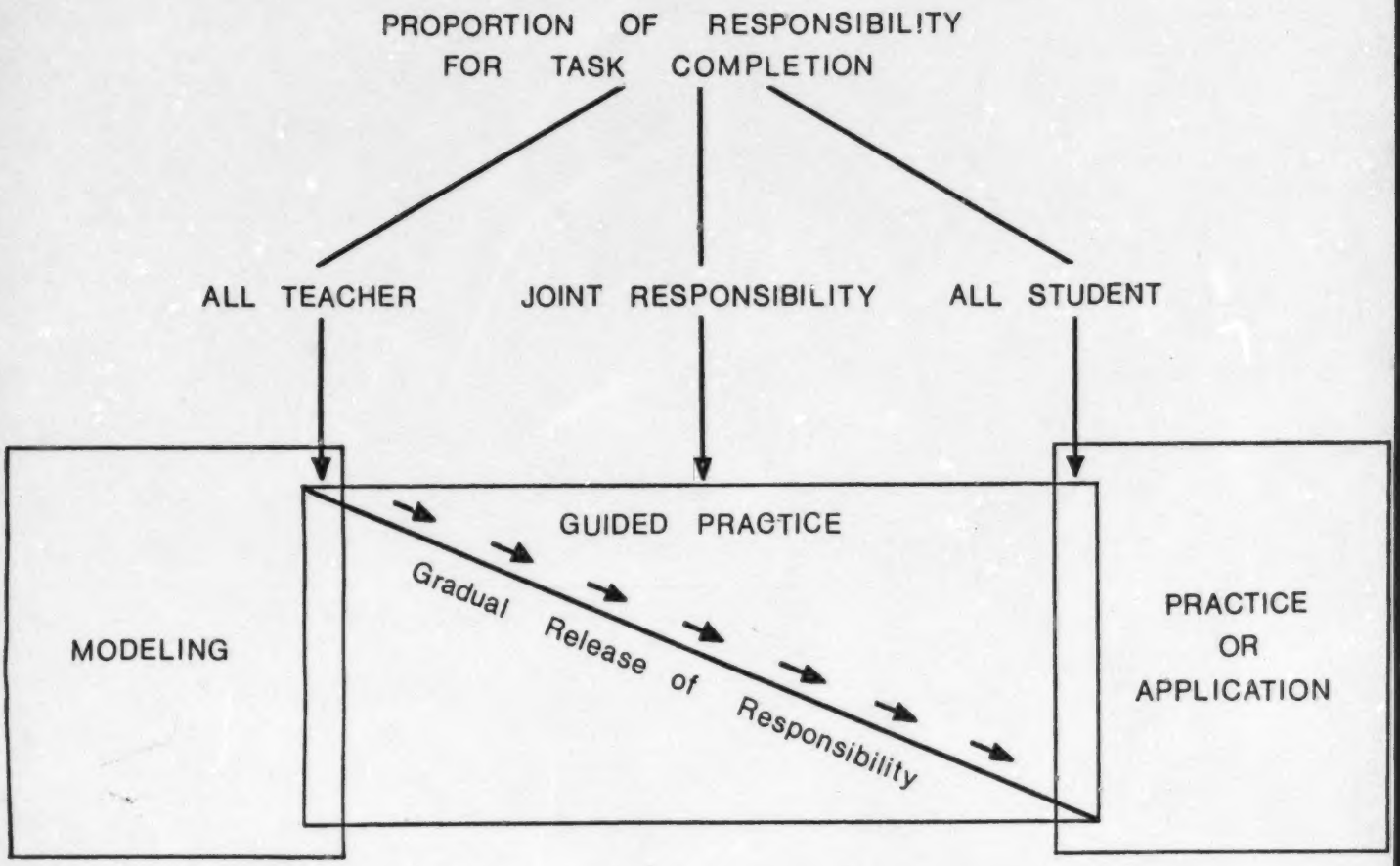
[1]Much of this section is derived from an earlier, broader review of general models of instructional research in reading (Pearson & Tierney, in press). What differs is the context and purpose which the data serve.


PROPORTION OF RESPONSIBILITY
FOR TASK COMPLETION
ALL TEACHER
JOINT RESPONSIBILITY
ALL STUDENT
MODELING
GUIDED PRACTICE
Gradual Release of Responsibility
PRACTICE
OR
APPLICATION